

What is claimed is:

1. A method for preparing a thin fiber-structured polymer web, comprising the steps of:

5 dissolving a polymer in a volatile solvent used as a polymer solvent to prepare a polymer solution;

spinning the polymer solution by electrospinning;
and

forming a thin fiber-structured polymer web
10 cumulated on a collector.

2. The method as claimed in claim 1, wherein the volatile solvent is at least one having a high volatility selected from the group consisting of acetone,
15 chloroform, ethanol, isopropanol, methanol, toluene, tetrahydrofuran, water, benzene, benzyl alcohol, 1,4-dioxane, propanol, carbon tetrachloride, cyclohexane, cyclohexanone, methylene chloride, phenol, pyridine, trichloroethane and acetic acid.

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3. The method as claimed in claim 1, wherein the volatile solvent is a mixed solvent comprising at least one relatively high-volatility solvent and at least one relatively low-volatility solvent, the
25 relatively high-volatility solvent being selected from

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the group consisting of acetone, chloroform, ethanol, isopropanol, methanol, toluene, tetrahydrofuran, water, benzene, benzyl alcohol, 1,4-dioxane, propanol, carbon tetrachloride, cyclohexane, cyclohexanone, methylene chloride, phenol, pyridine, trichloroethane and acetic acid, the relatively low-volatile solvent being selected from the group consisting of N,N-dimethyl formamide (DMF), dimethyl sulfoxide (DMSO), N,N-dimethylacetamide (DMAc), 1-methyl-2-pyrrolidone (NMP), ethylene carbonate (EC), propylene carbonate (PC), dimethyl carbonate (DMC), acetonitrile (AN), N-methylmorpholine-N-oxide, butylene carbonate (BC), 1,4-butyrolactone (BL), diethyl carbonate (DEC), diethylether (DEE), 1,2-dimethoxyethane (DME), 1,3-dimethyl-2-imidazolidinone (DMI), 1,3-dioxolane (DOL), ethyl methyl carbonate (EMC), methyl formate (MF), 3-methyloxazolidin-2-on (MO), methyl propionate (MP), 2-methyletetrahydrofuran (MeTHF) and sulpholane (SL).

4. The method as claimed in claim 1, wherein the relative humidity in a working space for the electrospinning is 0 to 40 %.

5. The method as claimed in claim 1, wherein the temperature of the polymer solution during the

electrospinning is in the range from 40 °C to the boiling point of the solvent.

6. The method as claimed in claim 1, wherein
 5 the content of the polymer used in the preparation of the polymer solution is 0.1 to 40 wt.% based on the content of the solvent.

7. The method as claimed in claim 1, wherein
 10 the polymer is selected from the group consisting of poly(vinylidene fluoride (PVDF), poly(vinylidene fluoride-co-hexafluoropropylene), polyacrylonitrile, poly(acrylonitrile-co-methacrylate), polymethylmethacrylate, polyvinylchloride,
 15 poly(vinylidenechloride-co-acrylate), polyethylene, polypropylene, nylon12, nylon-4,6, aramid, polybenzimidazole, polyvinylalcohol, cellulose, cellulose acetate, cellulose acetate butylate, polyvinyl pyrrolidone-vinyl acetates, poly(bis-(2-(2-methoxyethoxyethoxy))phosphazene) (MEEP), poly(propyleneoxide),
 20 poly(ethylene imide) (PEI), poly(ethylene succinate), polyaniline, poly(ethylene sulphide), poly(oxymethylene-oligo-oxyethylene), SBS copolymer, poly(hydroxy butyrate), poly(vinyl acetate), poly(ethylene terephthalate), poly(ethylene oxide), collagen,
 25 poly(lactic acid), poly(glycolic acid), poly(D,L-lactic-

co-glycolic acid), polyarylates, poly(propylene fumalates), poly(caprolactone), biopolymer, coal-tar pitch, petroleum pitch, or copolymer of them, or blend of more than two of them.

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8. The method as claimed in claim 7, wherein the polymer is mixed with an emulsion, or an organic or inorganic powder.

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9. The method as claimed in claim 1, wherein the collector is an anode comprising at least one selected from the group consisting of LiCoO_2 , LiMn_2O_2 , LiMn_2O_4 , LiNiO_2 , LiCrO_2 , LiVO_2 , LiFeO_2 , LiTiO_2 , LiScO_2 , LiYO_2 , LiNiVO_4 , LiNiCoO_2 , V_2O_5 and V_6O_{13} ; or a cathode comprising at least one selected from the group consisting of a carbon material including graphite, cokes or hard carbon, tin oxide, lithium compound of these materials, metal lithium and metal lithium alloy.

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10. The method as claimed in claim 1, wherein the collector has its upper part provided with a filtering medium.

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11. The method as claimed in claim 1, further comprising the step of compulsorily discharging air

containing a large amount of the solvent to the outside while injecting air into the working space during the electrospinning.

5 12. A thin fiber-structured polymer web obtained by the method according to claim 1.

10 13. A filter obtained by laminating the thin fiber-structured polymer web manufactured by the method according to claim 1.

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